Chapter X

Economic Ramifications of Obesity: A Selective Literature Review

Introduction

Obesity is a pervasive problem not only domestically but also globally. Currently, a fifth of the global population and a third of the U.S. population are obese. Until the early 1980s, about 1 in 6 adults were obese. As reported recently by the World Health Organization (WHO), the top ten most obese industrialized countries are in order the United States, New Zealand, Canada, Israel, United Kingdom, Greece, Lithuania, Poland, Hungary, and France.

Globally, men and women face markedly different risks of obesity. In general, obesity is more prevalent among women than men. According to the Behavioral Risk Factor Surveillance System of the Centers for Disease Control and Prevention, in 2014 obesity prevalence varied widely across U.S. states and territories. No state had a prevalence of obesity less than 20%. In 2014, the Midwest had the highest prevalence of obesity (30.7%), followed by the South (30.6%), the Northeast (27.3%), and the West (25.7%). Additionally, racial variations were evident in the prevalence of obesity. Non-Hispanic blacks had the highest prevalence of self-reported obesity (38.1%), followed by Hispanics (31.3%), and non-Hispanic whites (27.1%) in 2014.

The coverage of the obesity epidemic has been quite extensive across medical, sociological, psychological, political and economic disciplines for at least 30 years. Simply put, our objective is to provide a selective review of the literature on this topic as relevant to agricultural economics. In this review, we address various issues: (1) the metrics of obesity; (2)

the causes and the consequences of obesity; (3) the role of government in attempting to reduce obesity rates; and (4) insights from behavioral economics in combatting the incidence of obesity.

Metrics of Obesity

The primary sources of obesity statistics are the Centers for Disease Control and Prevention (CDC) and the WHO. Typically, adults are classified as obese if their body mass index (BMI) or Quetelet index exceeds 30kg/m^2. Put simply, the calculation of BMI takes into account the height and weight of any individual. Formally, BMI is defined as weight in kilograms divided by the square of height in meters or alternatively as weight in pounds*703/height in $inches^2$. BMI is universally expressed in units of kg/m^2.Commonly accepted BMI ranges are underweight: under 18.5 kg/m^2, normal weight: 18.5 to 25 kg/m^2, overweight: 25 to 30 kg/m^2, obese: over 30 kg/m^2.

Causes and Consequences of Obesity

Obesity, currently classified as a disease by the CDC, is attributed to caloric imbalance, where more calories are consumed than expended. The actual causes of obesity are far more complex. Obesity results from combination of causes and contributing factors, which can be genetic, behavioral, economic, environmental, social, and even political. Additional contributing factors include education as well as marketing and promotion. This section reviews the literature on some of the underlying causes and consequences of obesity using only peer-reviewed research.

Causes of Obesity

Unhealthy diet, inadequate physical activity, and other individual, biological and genetic factors have been identified as primary causes of increase in obesity in the existing literature (Baum and

Ruhm, 2009; Philipson, Posner, 2003). However, these factors alone might not provide a sufficient explanation, since many economic and social factors outside of the control of the individual can also affect obesity (Lakdawalla et al., 2005; Philipson, Posner, 2003). To illustrate, Finkelstein, Ruhm, and Kosa (2005) argue that owing to technological innovations in food processing, the price of calorie-dense pre-packaged and/or prepared foods has fallen relative to the price of less calorie-dense foods. As such, owing to economic forces, individuals have shifted their consumption of foods toward calorie-dense cheaper alternatives.

Additionally, the literature supports the notion that changes in technology have contributed to the rise in obesity (Philipson, Posner, 2003; Philipson, Posner, 2008; Lakdawalla, Philipson, 2002). That is, improved food processing technologies have made food more affordable and readily available than ever before resulting in increased food consumption (Cutler et al., 2003). As well, at the same time the labor-saving technologies in workplaces have made jobs more sedentary, requiring less caloric expenditure (Philipson, Posner, 2003; Philipson, 2001; Lakdawalla and Philipson, 2002; Wansink and Huckabee, 2005). Finkelstein et al., (2005) argued that the decline in manual labor began well before the rapid rise in obesity; hence technological progress may have been responsible for only a part of the increase in obesity.

Improvements in technology allowed for mass production of food and the widespread distribution of prepared foods to consumers (Cutler et al., 2003). Cutler et al. (2003) found that reductions in time costs of food preparation led to reductions in food prices and increases in calorie intake from prepared snack foods. Technological change also brought about a notable reduction in time spent on household production processes, thereby increasing labor force participation rates of women. But Cutler et al. (2003) also suggested that obesity was not primarily the result of more women working in the labor force. Further, Loureiro and Nayga

(2005) found that that the participation rate of women in the labor force had no significant effect on their incidence of obesity. However, in a contrary opinion, Anderson et al. (2003) found that increased hours worked per week by mothers were associated with a significant increase in children's weight.

In general, the consumption of energy dense and nutrient empty foods such as added fats, and sugars, salty snacks, refined grain products, sweets, beverages, and fast foods is linked to obesity. A number of studies looked at the relationship between availability of fast food restaurants, food prices, and obesity (Rashad et al., 2006; Dunn, 2010; Currie et al., 2010; Chou et al., 2004; and Chou et al., 2008) as well as between food away from home expenditures and obesity (Drichoutis et al., 2012; Chou et al., 2004; and Rashad et al., 2006).Currie et al. (2010) found that the proximity to fast-food restaurants had a significant effect on the risk of obesity, while the proximity of non-fast food restaurants had no effect. Chou et al. (2004) examined the effect of restaurant density and the relative prices of fast-food and full-service restaurants and food consumed at home on obesity and found that lower fast-food and full-service restaurants prices were associated with higher-weight outcomes. Moreover, Chou et al. (2004) concluded that technological changes and economies of scale that resulted in a reduction in prices in fast-food restaurants led to increases in the demand for food away from home. Rashad et al. (2006) reported that an increase in the per capita number of restaurants resulted in increased obesity

Furthermore, the literature supports the idea that variations in the neighborhood environment can be responsible for the increase in obesity rates by affecting diet and exercise. Existing research on examining the relationship between urban sprawl and obesity based on cross-sectional data found that living in a sprawling county or metropolitan area was associated with higher rates of obesity (Ewing et al., 2003). But no relationship was found based on longitudinal data (Ewing et

al., 2006). Using a sample of recent movers, Plantinga et al. (2007) examined the relationship between patterns of urban land development and obesity. They found that an individual's BMI is a significant factor in determining the choice of a dense or sprawling location. As well, they found that individuals who move to more dense population locations not only lose weight, but also that the greater the change in population density, the greater the weight loss.

Consequences of Obesity

Obesity is a major public health issue and a known cause of many chronic health conditions. Chronic health conditions such as diabetes, high blood pressure, asthma, cholesterol, cardiovascular disease and other diseases and cancers in turn become primary drivers of health care spending (Grundy, 2004; Bray, 2004; Mokdad et al., 2001; Flegal et al., 2002; Dixon, 2010; and Hu 2008). Extreme obesity and its resulting chronic health conditions raise medical expenditures, negatively affect the health care system and result in productivity losses due to disability, illness and premature mortality (Quesenberry, 1998; Finkelstein et al., 2003; and Andreyeva et al., 2004). Compared to normal weight or overweight individuals, obese individuals have much higher mortality rates and higher risks of disability (Allison et al., 1999; Calle et al., 1999; Engeland et al., 2003; Fontaine et al., 2003; Peeters et al., 2003; Flegal et al., 2005; Sturm et al. 2004; Sturm 2002).

Many existing studies have estimated the effect of obesity on national health care costs (Cawley and Meyerhoefer, 2012; Finkelstein et al., 2003; Finkelstein et al., 2009; Thorpe et al., 2004; Trasande et al., 2009). According to Cawley and Meyerhoefer (2012), annual medical costs were estimated to be $2,741 for men and women taken together, $3,613 for women as a group and $1,152 for men as a group. Per capita medical spending for obese individuals was

$1,429 higher or roughly 42 percent higher than for normal weight individuals (Finkelstein et al., 2009). For both men and women, the costs of obesity were much higher than the costs of being overweight. The annual medical costs of being obese were $4,879 for an obese woman and $2,646 for an obese man, whereas, the annual costs of being overweight were $524 and $432 for women and men, respectively (Dor et al., 2010).

Cawley and Meyerhoefer (2012) estimated the medical care costs of obesity related illness in adults in the United States to be $209.7 billion in 2005. As such, roughly 21% of U.S. national health expenditures were spent treating obesity-related illness in 2005. Finkelstein et al. (2009) estimated the costs of obesity among U.S. full-time employees to be $85.7 billion. Overweight and obese individuals were more likely to be more absent from work due to health-related issues than non-obese and non-overweight individuals. Obese men miss two additional days of work and obese women miss between one and five working days annually compared to normal weight men and women, respectively (Finkelstein et al., 2005). Using the 2006 Medical Expenditure Panel Survey and the 2008 National Health Wellness Survey, Finkelstein et al. (2010) quantified per capita and aggregate medical expenditures and the value of lost productivity, including absenteeism. They estimated the annual cost of obesity among full-time employees to be $73.1 billion; roughly a fifth of this annual cost resulted from increases in absenteeism.

The effects of obesity on wages are well documented in the existing literature (Averett and Korenman, 1996; Cawley, 2004; Baum and Ford, 2004; Morris, 2006; Han et al., 2009; and Cawley et al., 2009). There also exists an extensive literature on the effect of obesity on employment (e.g., Morris, 2007; Norton and Han, 2008; Han et al., 2009; and Cawley et al., 2009). Obese individuals have substantial lower employment probability than healthy-weight

individuals (Han et al., 2009; Morris, 2007). Additionally, obesity has a negative impact on wages and leads to an increase in the cost of life insurance and other personal expenses. Cawley (2004) found that overweight and obese females of various ethnic groups tended to earn less wages compared to healthy-weight females. Further, Dor et al. (2010) estimated annual wage losses of $750 for obese men and $1,855 for obese women. One explanation for lower wages among overweight and obese adults is that they are more likely to suffer from chronic diseases, which in turn leads to more expensive medical bills paid by employers (Cawley 2004; and Yang and Hall 2008).

Ricci and Chee (2005) estimated that costs associated with reduced productivity were $358 per obese worker per year. Goetzel et al. (2010) estimated the costs per obese worker to be $54, while Gates et al. (2008) estimated these costs to be $575. Thompson et al. (1998) estimated that an additional $2.6 billion on life insurance was spent as a result of being overweight or obese. Dor et al. (2010) calculated that life insurance costs of being overweight and obese. Compared to normal-weight individuals, overweight and obese individuals incurred an additional $14 and $111, respectively, in annual life insurance costs.

Role of Government

Various government efforts at federal, state and city levels in the United States have focused on a multitude of methods to combat the obesity epidemic in recent years. These methods ranged from market driven tools such as imposition of taxes at various stages of supply chain (manufacturer and consumer level taxes) to quantity reduction efforts through regulation such as banning consumption of certain food and beverage products with added sugars, which are over certain levels of serving sizes. Government intervention in attempting to combat the obesity

epidemic in the United States has focused primarily on mitigating the consumption of food and beverages that are high in calories.

Various studies in the extant literature have shown that consumption of sugar-sweetened beverages (SSBs) have contributed to rising obesity rates in the United States (see Qi et al., 2012; de Ruyter et al., 2012; Ebbeling et al., 2012; and Kaiser et al., 2013). The most widely proposed (and used) government intervention has been the use of excise or sales taxes on sugar-sweetened beverages (Jacobson and Brownell, 2000; Brownell et al., 2009; Chaloupka, Powell and Chriqui, 2009; and U.S. Senate Finance Committee, 2009) and taxes on snack foods (Kuchler et al., 2005; and Chouinard et al., 2007). According to Dharmasena, Davis and Capps, (2014), the empirical literature on evaluating the tax on SSBs can be partitioned into two main subgroups. One group of studies only focused on the direct effects of taxes on SSBs while ignoring the possible substitution effects as a result of a tax (Jacobson and Brownell, 2000; Brownell et al., 2009; and Andreyeva, Chaloupka and Brownell, 2011). But another group of studies incorporated the possible substitution effects between beverages that are high in added sugars (added calories) as well as those that are naturally high in calories, yet not considered unhealthy, such as 100% fruit juices, and whole and reduced fat milk (Finkelstein et al., 2010; Smith, Lin and Lee, 2010; Lin et al., 2011; Zhen et al., 2011; and Dharmasena and Capps, 2012). A third group of studies (Fletcher, Frisvold and Tefft, 2010a, 2010b; Sturm et al., 2010; and Dharmasena, Davis and Capps, 2014) looked at differences across states in terms of soft drink tax rates and then estimated differences in caloric intake and weight associated with different tax rates.

In Table 1, various studies in the extant literature dealing with taxing beverages are compared in terms of data used, the outcomes of the tax implemented on caloric intake, and the reductions in body weight.

According to these studies, it is clear that the reduction in body weight (and obesity) as a result of a tax on sugar-sweetened beverages is quite small. To add to this finding, Finkelstein et al., (2013) estimated the effect of a 20% tax on SSBs on body weight when substitutions to high-calorie non-beverage items were considered. They found that the average per capita weight loss was on the order of 1.6 pounds in the first year and a cumulative weight loss of 2.9 pounds. Further, several studies in the extant literature have investigated impacts of SSB taxes on the supply side of the economy by calculating lost revenue to manufacturers (Andreyeva, Chaloupka, and Brownell, 2012; and Dharmasena, Davis and Capps, 2014). Bottom line, when taking into account substitution possibilities attributed to a tax on SSBs, the extant literature reveals that this intervention does not offer much to combat obesity.

As a result of these excise or sales taxes, the consumption of taxed food and beverages is expected to decline, which in turn could have negative consequences on revenue generated by agribusinesses as well as available employment opportunities. However, due to cross-price effects associated with taxed and non-taxed beverages, consumption of non-taxed food and beverage products are expected to rise (Dharmasena and Capps, 2012), which in turn could increase calorie consumption exacerbating obesity related issues, especially if consumers substitute other high-calorie food and beverage products for the aforementioned taxed products.

Economists, politicians, nutritionists, and journalists have questioned the impact of U.S. farm policies in making so-called calorie-dense foods cheaper compared to healthy counterparts. Alston, Rickard and Okrent (2010) showed that U.S. farm policies have had modest and mixed

effects on prices and quantities of farm commodities with very small effects on the prices paid by consumers for food and beverage products. As a result, it was concluded that the effects of U.S. farm policy on dietary patterns and obesity were not significant. Similar effects also have been shown by Okrent (2010), Alston, Summer and Vodti (2008), and Beghin and Jensen (2008). These findings suggest that agricultural policy designed to assist domestic producers does not contribute to the obesity epidemic in the United States.

Another perspective to the role of government in reducing the obesity epidemic pertains to nutrition education programs design to assist in cutting back on food and beverage products high in calories and in increasing the consumption of fruits and vegetables along with the consumption of whole grains and dietary fiber. The Dietary Guidelines for Americans (DGA) put together by U.S. Department of Agriculture and U.S. Department of Health and Human Services and www.ChooseMyPlate.gov provide valuable information concerning nutrition education for U.S. consumers to help in choosing healthy food and beverage products so as to mitigate conditions like obesity, diabetes, and cancer. A few studies in the extant literature have investigated the impact of the DGA on the intake of various nutrients, fiber and calories and the effects of the DGA on the body weight. These studies generated mixed outcomes in regard to the effectiveness of the dietary guidelines on reducing the consumption of calories (Dharmasena, Capps and Clauson, 2011), whole grains (Mancino and Kuchler, 2012) and dietary fiber (Senia and Dharmasena, 2016).

The Supplemental Nutrition Assistance Program (SNAP), the Women's, Infants, and Children Program (WIC), and the National School Lunch Program (NSLP) also have been implemented to provide food assistance and nutrition interventions principally to low-income individuals. Several research studies in the literature investigated the impact of these programs

on obesity (Gundersen et al., 2011; Cawley and Meyerhoefer, 2012; Finkelstien et al., 2009; Wolf and Coldtiz, 1998; Nord and Golla, 2009; Yen et al., 2008; Tiehen, Jolliffe and Gundersen, 2012; Casey et al., 2001; Casey et al., 2006; Dubois et al., 2006; Jyoti et al., 2005; and Dharmasena, Bessler and Capps, 2016). The extant literature has provided mixed outcomes. For example, some studies found that participation in food assistance programs led to increases in obesity rates in the United States (Cawley and Meyerhoefer, 2012; Finkelstien et all., 2009; Wolf and Coldtiz, 1998). Casey et al., (2001); Casey et al., (2006), Dubois et al., (2006); and Jyoti et al. (2005) found evidence to support the positive relationship between obesity and food insecurity, especially in children. According to Dharmasena, Bessler and Capps (2016), obesity and participation in the SNAP are indirectly related via several back-door paths, namely, race, income, poverty, food insecurity and unemployment. Furthermore, obesity and food insecurity are related via several back-door paths as well (income, food taxes, race and ethnicity are direct causes of obesity).

Moreover, Wilde (2005) suggested that federally-sponsored promotion programs, known as commodity checkoff programs, result in increased consumption of beef, pork, and dairy products. As such, commodity checkoff programs may lead to increases in incidences of obesity. Hence, inconsistences are evident with respect to government involvement in dealing with the obesity problem in the United States.

Insights from Behavioral Economics

Neoclassical economics assumes that rational agents make decisions based on full information and act according to their own self-interests. In reality, individuals rarely possess full information or unconstrained time and cognitive resources to make decisions. Incorporating

psychological aspects into economics to explain human behavior has gained popularity following the seminal work of Simon (1955), Kahneman and Tversky (1979), Thaler (1980) and others. A key question often asked about the use of behavioral economics principles is whether policymakers should "paternalistically" intervene to influence agent decisions. An emerging movement known as *libertarian paternalism* (Thaler and Sunstein 2003) or *asymmetric paternalism* (Camerer et al. 2003) poses that behavioral economics can be used for enacting policies designed to "nudge" individuals while preserving their freedom of choice (Bhargava and Loewenstein, 2015; and Wansink, 2015).

The general idea is that the cost of decisions can be reduced by simplifying choices or aligning "default choices" to make them beneficial to the agent's self-interest. For example, most restaurant menu options have one or two side dishes which are included in the price of the meal. In this case, most patrons will perceive not eating the side dishes as a loss since the cost of the meal is fixed. What if the "default" options were healthy alternatives, or if customers only had to buy the main entrée at a lower price and each side dish were charged separately? Recent work by Just and Wansink (2011) suggest that there may be a reduction in calories consumed since individuals in a fixed-price context may eat more in order to get their money's worth. Note that this setup does not limit individual choices and the relative prices can be set to keep the total cost of the meal at the same level. This setup incorporates behavioral "nudges" and also financial incentives. Although the profit maximization of the restaurant owner is not accounted for in this simple example, it is conceivable that the potential losses associated with a reduction of the price per-meal may also attract additional customers thus increasing overall sales.

Behavioral economics can provide useful answers about the potential outcomes to obesity intervention programs designed to influence food choices and physical activities (Just, 2006; Just

and Payne, 2009; List and Samek, 2015; Liu et al., 2014; and Galizzi, 2014). However, *obesity* is a complex issue and the *physiologically* optimal weight of an individual can be affected by psychological, environmental and social and cultural aspects related to appearance self-esteem and social norms (Levy, 2002). Most obese individuals do not normally receive a diagnosis or weight-related counseling (Bleich, Pickett-Blakely, and Cooper, 2011). Simple measures such as medical preventive visits and physicians counseling can reduce calorie intake and promote exercising (Loureiro and Nayga, 2007; and Bleich, Pickett-Blakely, and Cooper, 2011).

Should policy be used to try to reduce obesity? The main arguments to do so are that the actions of an individual affect others and that the public cost of obesity is enormous (Yaniv, Rosin, and Tobol, 2009). Indeed, most obese individuals want and try to lose weight with a higher prevalence for women than man (Bish et al., 2005). Typically, males and females trying to lose weight use similar weight loss strategies (Bish et al., 2005). However, it is likely that self-image and identity factors yield asymmetric results of intervention programs by gender. Intervention programs should consider customizing activities by gender, age and targeted goals (i.e. programs targeting extremely obese individuals need to set realistic goals to account for potential social and peer influence). In reality, weight loss is difficult to achieve, but sustaining attained losses over time may be even harder (Dragone, 2009; and Rosin, 2012).

As previously discussed, one of the approaches to reduce obesity is to implement *direct policy interventions* such as imposing taxes on unhealthy food or adding subsidies for healthy food or exercising equipment. While some studies find that taxing unhealthy food may reduce consumption (Zhen et al., 2010), the full effects of such policies need to be carefully evaluated (Streletskaya et al., 2014). Yaniv, Rosin, and Tobol (2009), for example, show that due to spillover income and substitution effects of food intake and leisure time for exercising, taxing

unhealthy food or subsidizing healthy food may increase obesity depending on how weight conscious a person is.

Other policies may be categorized as improving transparency in information or promoting healthy food (Nayga, 2008; and Rusmevichientong et al., 2014), which assumes that better informed individuals make better food choices (Shimokawa, 2013; Øvrum et al., 2012; Burton et al., 2006; and Liu et al., 2014). This is not always the case (Wansink, van Ittersum, and Painter, 2004). An abundant literature documents that the type of information presented to consumers and how it is presented influences their food choices (Drichoutis et al., 2008; Becker et al., 2015; Banterle and Cavaliere, 2014; Zhu, Lopez, and Liu, 2015; Burton et al., 2006; Kim et al., 2012; Liaukonyte et al., 2013; and Puhl, Peterson, and Luedicke, 2013). Adding healthy options may effectively increase healthy choices in some cases (McCluskey, Mittelhammer, and Asiseh, 2012), but some work also suggest that healthy nutritional labels may decrease consumption due to consumer's perceptions of a tradeoff between healthy food and taste (Berning, Chouinard, and McCluskey, 2010). Low-fat nutrition labels may even result in the opposite intended effect, particularly by overweight individuals by reducing consumption guilt or changing the perceptions of serving sizes (Wansink and Chandon, 2006).

Commitment devices can be effective in changing food consumption behavior (Guthrie, Mancino, and Lin, 2015; Chandon and Wansink, 2012; Wansink, 2015; Fan and Jin, 2013; and Zhang and Rashad, 2008). Pioneering work by Wansink (2007) and his colleagues shows promising venues that can be effective in changing "mindless eating" behavior. Small changes in the food environment such as buying smaller packages, using smaller dishes and limiting the access and salience of unhealthy tempting food have proven to be effective and can easily be implemented in many settings (Wansink and Chandon, 2014). Other commitments include for

example, choosing healthier alternatives before being hungry (Just, Mancino, and Wansink, 2007), committing to a predetermined grocery shopping list (Au et al., 2013), among others. As Wansink and Chandon (2014) cleverly put it "it is easier to change our food environment than to change our mind."

The implementation of commitment devices needs to evaluate the outcomes of financial and nonfinancial incentives in order to assess their feasibility for public policy (List and Samek, 2015). Economic and behavioral incentives may work to some extent, but programs also need to carefully consider that some individuals may want to commit to better diets but they may lack the financial resources to purchase healthier food. The use of preventive measures targeting children and adolescents is likely to yield high returns (Boumtje et al.. 2005). Targeting adolescents and children should be a priority since they are a vulnerable at-risk group still forming life-lasting habits (Li et al., 2016).

Concluding Remarks

Obesity is a complex multi-faceted health problem/disease in America today, involving medical, sociological, psychological, political, and economic dimensions. The pronounced focus on obesity prevention is not surprising because rates of incidence have increased sharply with no sign of abatement. Various government intervention programs, such as taxes on high-calorie foods and beverages, restricting the consumption of high-calorie beverages by imposing a limit on container sizes where these beverages are sold, and nutrition education programs like Dietary Guidelines for Americans and www.ChooseMyPlate.gov are in place to combat the obesity epidemic in America today. Nevertheless, these interventions have provided mixed outcomes in dealing with the widespread problem of obesity. Because many variables affecting obesity and

affected by obesity are interacting in a complex food-nutrition-consumer-producer-government interface, finding a permanent solution to the pervasive problem of obesity is as complex as the problem itself. However, continued but perhaps more structured or customized government intervention programs must be undertaken in order to provide concerted efforts to fight the chronic condition of obesity.

Alternatively, there are areas in which behavioral economics can provide valuable insights in dealing with the seemingly ubiquitous issue of obesity. These general areas can be grouped into the following categories: (1) help to better understand and isolate the effects of existing policies in a more controlled environment; (2) examine the role and feasibility of monetary and non-monetary incentives in changing outcomes of obesity through public policy; (3) evaluate the potential demand for commitment devices and the associated outcomes for obesity; (4) investigate the persistence of effective short-term policies over the longer term; and (5) identify potential asymmetries in obesity outcome gains by different at risks groups to customize policy interventions (perhaps with an emphasis on children and adolescents). One potential negative externality of behavioral interventions is that the same behavioral principles can be used by firms to promote the consumption of their products whether they are healthy or not. This begs the question as to what role, if any, should policy have in protecting consumers into what Bhargava and Loewenstein (2015) call "*behavioral exploitation*." That said, without question the use of the guiding principles of behavioral economics in conjunction with other emerging disciplines such as neuroeconomics will likely continue to gain the attention of agricultural economists and policy makers as a way to combat obesity.

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